

Amendments to the Drawings

The attached sheets of drawings includes changes to Figs 4A-4G. In 4A-4G, the labels "Solution Flow Controlling Unit" and "Magnetic Member Controlling Unit" are added. No new matter is added.

REMARKS

The Applicants request reconsideration of the rejection.

Claims 1-9, 19 and 21 remain pending.

Claims 1-13 and 19-22 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. It is the Applicants' understanding that this rejection is based on the expression switch the application of the magnetic fields to move the magnetic micro-particles within the vessel, and specifically that this expression includes both turning off and on the application of the magnetic fields and reversing the direction of the magnetic fields. To clarify, independent claim 1 has been amended to recite a magnetic member controlling unit that controls on/off setting of the magnetic members to switch on/off application of magnetic fields to the magnetic members. In accordance with this amendment, the Applicants refer the Examiner to the present specification, by way of example, between page 11, line 7 and page 12, line 6, which describe an operation related to magnetic micro-particles involving the use of electromagnets 405-407 and solution flow in a capillary 401. In particular, a magnetic micro-particle 402 with a first probe immobilized thereto is poured into the capillary 401. An electromagnet 405 in a most distant position from the pouring location is turned on, and the other electromagnets 406-407 are turned off. Next, a magnetic micro-particle 403 having a second probe immobilized thereto is poured in, and a second electromagnet 405 is turned on. A solution is poured into the capillary 401, and by turning off the first electromagnet 405 (most distant downstream), the magnetic micro-particle 402 can be collected. Then, the electromagnet 406 is turned off, permitting collection of the micro-particle 403 and the probe immobilized thereto. By repeating the procedure of turning on the

electromagnets to retain the magnetic micro-particles, and then turning off the electromagnets to release the magnetic micro-particles held thereby, in order from the most downstream location, the magnetic micro-particles and probes immobilized thereto can be taken out. Thus, the Applicants believe that the amended claims are in full satisfaction of the first paragraph of §112.

Claims 1-13 and 19-22 also stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for the reasons set forth on page 4 of the Office Action. The Applicants have amended the claims to increase their clarity, including enhancing the structural recitation of the invention.

Claims 1, 19, 2-4, 7-8, 21, 10, 20, 11-13 and 22 stand rejected under 35 U.S.C. §102(b) as being anticipated by Burd Mehta et al., PCT International Application Publication No. WO 00/50172 (Burd Mehta). The Applicants traverse as follows.

While Burd Mehta is directed to manipulation of micro-particles, the purpose, as well as the structure and operation for manipulating the micro-particles, is different from that of the present invention. In particular, Burd Mehta retains micro-particles using magnetic fields so as to create particle retention regions for magnetic particles, the fixed particles acting as retention elements to block flow of the retained particles. Burd Mehta does not disclose or fairly suggest a magnetic member controlling unit that controls on/off setting of magnetic members to switch on/off application of magnetic fields to the micro-particles, wherein the magnetic members are set off in order of location from downstream of the solution flow after setting the plurality of magnetic members on in order of location from downstream of the solution flow.

In this regard, the Applicants have reviewed the Examiner's comments with regard to specific locations in Burd Mehta. However, page 18, lines 1-10 do not describe a microfluidic device that incorporates magnetic control elements, but rather describes a pressure based flow used for introducing and reacting reagents in a system in which the products are electrophoretically separated after loading using electrokinetic fluid control. The fluid flow and flow of materials are suspended or solubilized within the fluid, under pressure regulated by, for example, a piston, pressure diaphragm, vacuum pump, probe or the like.

Further, page 22, line 29 – page 23, line 10 describe the flow and fixing of a first particle set within a channel, and a second particle set abutting the first fixed particle set, wherein the first fixed particle set blocks further flow of the second particle set, resulting in a second fixed particle set. The first particle set may be fixed by a physical barrier, a magnetic field proximal to or within the particle retention region, a chemical particle capture moiety that is proximal to or within the particle retention region, or the like. There is no description of releasing the particles from the particle retention region or setting a magnetic field on/off. Therefore, the Applicants respectfully submit that the amended claims are not anticipated by Burd Mehta.

Claims 1, 19 and 5-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Burd Mehta in view of Southgate, U.S. Patent No. 5,863,502 (Southgate). Southgate is cited as teaching a system comprising fluidic channels for moving magnetic beads and having the ability to allow a field gradient acting upon the beads to be maximized.

The Applicants respectfully traverse, noting that Southgate's scheme utilizes sharp-edged magnets to retain paramagnetic beads in one place and to move beads located in a fluid exchange channel, etc., but wherein the beads are retained within the chamber while fluid in the chamber is removed. Therefore, there is no suggestion, according to Southgate, to retain and then remove the beads so that, in any combination with Burd Mehta, the present invention may be met. Accordingly, a combination of Burd Mehta and Southgate, however motivated, does not reach the claimed invention.

Claims 1, 19 and 9 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Burd Mehta in view of Harrison et al., U.S. Patent No. 6,432,290 (Harrison). Harrison is cited as teaching a vessel comprising channels, and having a transport mechanism for collecting micro-particles from an opening end of the vessel. However, Harrison is directed to mass spectroscopy, and neither discloses nor suggests the features of retaining and releasing magnetic members as set forth above. Accordingly, no combination of Burd Mehta and Harrison, however motivated, can be said to teach the claimed invention.

Claims 1, 19, 2-6, 8, 10, 20 and 11-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hauser et al., PCT International Application Publication No. WO 99/60170 (Hauser) in view of Forrest et al., U.S. Patent No. 4,141,687 (Forrest). The Applicants traverse as follows.

As argued previously, Hauser teaches to "oscillate" a magnetic field applied to a linear array of beads, including magnetic beads, by moving a hand magnet back and forth along the axis of the linear array, but does not disclose to switch the application of the magnetic field to move the particles.

Further, Hauser also intends to retain the particles within the channel. Therefore, Hauser does not disclose or suggest the retention and release characteristics, and structure therefor, of the present invention.

The secondary reference to Forrest describes a magnetic means which can vary a magnetic field from minimum to maximum when a magnetic trap is actuated. However, even in combination with Hauser, this teaching does not suggest to the person of ordinary skill a magnetic member controlling unit as claimed, or the retention and release characteristics of the claimed invention. Accordingly, the Applicants request reconsideration.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Hauser in view of Forrest and Burd Mehta. Claims 9 and 21-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Hauser in view of Forrest and Harrison. Each reference underlying these rejections, however, has been distinguished above. Therefore, it necessarily follows that the combination of these references, however motivated, does not render obvious the claimed invention. Accordingly, the Applicants request reconsideration.

In view of the foregoing amendments and remarks, the Applicants request reconsideration of the rejection and allowance of the claims.

To the extent necessary, the Applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to

the deposit account of Mattingly, Stanger, Malur & Brundidge, P.C., Deposit Account No. 50-1417 (referencing attorney docket no. H&A-126).

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.

/Daniel J. Stanger/
Daniel J. Stanger
Registration No. 32,846

DJS/sdb
(703) 684-1120

Attachment: Replacement Sheet